

Quick Start



**Allen-Bradley**

# SMC Dialog Plus™ Controller

Bulletin 150



## Important User Information

Solid-state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (publication [SGI-1.1](#) available from your local Rockwell Automation sales office or online at <http://www.rockwellautomation.com/literature/>) describes some important differences between solid-state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid-state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.



**WARNING:** Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.



**ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.



**SHOCK HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



**BURN HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

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### IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

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## Introduction

This quick start guide provides you with the basic information required to start up your SMC Dialog Plus™ controller. Factory default settings and information regarding installing, programming, and calibrating the controller are described here.

The information provided in this Quick Start Guide does not replace the User Manual, which can be ordered or downloaded by visiting [www.ab.com/literature](http://www.ab.com/literature). The Quick Start guide assumes the installer is a qualified person with previous experience and basic understanding of electrical terminology, configuration procedures, required equipment, and safety precautions.

For safety of maintenance personnel as well as others who might be exposed to electrical hazards associated with maintenance activities, follow all local safety related work practices (e.g., the NFPA 70E, Part II in the United States). Maintenance personnel must be trained in the safety practices, procedures, and requirements that pertain to their respective job assignments.

For detailed SMC-Dialog Plus information including setup, programming, precautions, and application considerations, refer to the following:

<b>For Documentation</b>	SMC-Dialog Plus User Manual 150-5.3	<a href="http://www.ab.com/literature">www.ab.com/literature</a>
<b>For Technical Support</b>	E-mail Support	<a href="mailto:raictechsupport@ra.rockwell.com">raictechsupport@ra.rockwell.com</a>
	Telephone Support	440-646-5800, option 2, option 4 or use direct dial code 804

## Cautions and Warnings

The following cautions and warnings must be observed while installing and using the SMC Dialog Plus controller.

## General Precautions



**ATTENTION:** Hazardous voltage is present in the motor circuit even when the SMC-Dialog Plus controller is off. To avoid shock hazard, disconnect the main power before working on the controller, motor, and control devices such as Start-Stop push buttons. Procedures that require parts of the equipment to be energized during troubleshooting, testing, etc., must be performed by properly qualified personnel, using appropriate local safety work practices and precautionary measures.



**ATTENTION:** Failure of solid-state power switching components can cause overheating due to a single-phase condition in the motor. To prevent injury or equipment damage, the use of an isolation contactor or shunt trip type circuit breaker on the line side of the SMC is recommended. This device should be capable of interrupting the motor's lock rotor current.



**ATTENTION:** Hazardous voltages that can cause shock, burn, or death are present on L1, L2, L3, T1, T2, and T3. Disconnect the main power before servicing the motor controller, motor, or associated wiring.



**ATTENTION:** The controller contains ESD (electrostatic discharge) sensitive parts and assemblies. Static control precautions are required when installing, testing, servicing, or repairing the assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures, refer to applicable ESD protection handbooks.



**ATTENTION:** An incorrectly applied or installed controller can damage components or reduce product life. Wiring or application errors, such as undersizing the motor, incorrect or inadequate AC supply, or excessive ambient temperatures, may result in malfunction of the system.



**ATTENTION:** Only personnel familiar with the controller and associated machinery should plan or implement the installation, start-up, and subsequent maintenance of the system. Failure to do this may result in personal injury and/or equipment damage.



**ATTENTION:** Disconnect the controller from the motor before measuring insulation resistance (IR) of the motor windings. Voltages used for insulation resistance testing can cause silicone-controlled rectifier (SCR) failure. Do not make any measurements on the controller with an insulation resistance (IR) or Megger tester.



**ATTENTION:** The controller can be installed on a system with power factor correction capacitors (PFCC). The PFCC capacitors must only be located on the line side of the SMC. Installing PFCC capacitors on the load side will result in SCR damage and failure.



**ATTENTION:** After a short-circuit occurs, device functionality **must** be verified.

## Overload



**ATTENTION:** Overload protection in the SMC Dialog Plus controller is disabled from the factory. The user must program the desired overload trip class and motor full load current rating to achieve proper protection



**ATTENTION:** Overload protection should be properly coordinated with the motor.



**ATTENTION:** During slow speed and/or braking operations, current waveforms exhibit non-sinusoidal characteristics. These non-sinusoidal characteristics inhibit the controller's current measurement capability. To compensate for additional motor heating that may result, the controller uses motor thermal modeling, which increments motor thermal usage. This compensation takes place when these options are in use: Preset Slow Speed, Smart Motor Braking, Accu-Stop, and Slow Speed with Braking.

## Communication



**ATTENTION:** Only one peripheral device can be connected to the SCANport. The maximum output current through the SCANport is 100 mA.

## Human Interface Module



**ATTENTION:** The Bulletin 1201 human interface module's stop push button is not intended to be used as an emergency stop. Refer to the applicable standards for emergency stop requirements.

## Control Options

### *Soft Stop*



**ATTENTION:** Soft Stop is not intended to be used as an emergency stop. Refer to the applicable standards for emergency stop requirements.

*Pump Control*

**ATTENTION:** Pump stopping is not intended to be used as an emergency stop. Refer to the applicable standard for emergency stop requirements.



**ATTENTION:** Pump stopping may cause motor heating depending on the mechanical dynamics of the pumping system. Therefore, select the lowest stopping time setting that will satisfactorily stop the pump.

*Preset Slow Speed*

**ATTENTION:** Slow speed running is not intended for continuous operation due to reduced motor cooling.

*SMB™ Smart Motor Braking Option*

**ATTENTION:** SMB Smart Motor Braking is not intended to be used as an emergency stop. Refer to applicable standards for emergency stop requirements.

*Accu-Stop™ and Slow Speed with Braking*

**ATTENTION:** Accu-Stop and Slow Speed with Braking are not intended to be used as an emergency stop. Refer to applicable standards for emergency stop requirements.

**Fast Acting Current-limiting Fuses**

**ATTENTION:** The fast acting current-limiting fuses specified in Table 2.C of the user manual may not provide branch circuit protection. Branch circuit protection in accordance with applicable electrical codes may require additional fusing (or a circuit breaker) even though fast acting current-limiting fuses are used.



**ATTENTION:** Applications requiring extended acceleration times or high duty cycles may experience nuisance tripping of the coordinated fast acting current-limiting fuses. This type of fuse has a limited thermal capacity that is less than that of the SCRs they are designed to protect. This makes them susceptible to thermal fatigue.

## Protective Modules



**ATTENTION:** To protect the Smart Motor Controller (SMC) and/or motor from line voltage surges, protective modules may be placed on the line, load, or both sides of the SMC. **Do not place protective modules on the load side of the SMC** when using pump or braking control.



**ATTENTION:** When installing or inspecting the protective module, make sure that the controller has been disconnected from the power source. The protective module should be inspected periodically for damage or discoloration. Replace if necessary.

**Note: Protective modules are not designed to protect against lightning strikes to equipment or distribution lines.**

## Electromagnetic Compatibility (EMC)



**ATTENTION:** This product has been designed for Class A equipment. Use of the product in domestic environments may cause radio interference, in which case, the installer may need to employ additional mitigation methods.

## Fan Power



**ATTENTION:** The fan jumpers have been factory installed for 110/120V AC input. Refer to Figure 3 of this quick start guide or Figure 3.6 through Figure 3.8 of the user manual for 220/240V AC fan wiring. Note that 220/240V AC fan wiring is not available for the 650...1000 A controllers. After wiring for the 97 A and 135 A controllers is complete, replace control terminal strip cover.

## Installation

The open-style design of the SMC Dialog Plus controller requires that it be installed in an enclosure. **The internal temperature of the enclosure must be kept within 0...5 °C (32...122 °F).**

The controller is convection cooled. It is important to mount the controller in a position that allows air to flow vertically through the power structure. Allow for a minimum of six inches (15 cm) of free space around all sides of the controller.

## Wiring

### Power Wiring

Refer to the product nameplate for power lug termination information including:

- Lug wire capacity
- Tightening torque requirements
- Lug kit catalog numbers (97...1000 A)

### Control Wiring

Refer to the product nameplate for control terminal wire capacity and tightening torque requirements. Each control terminal will accept a maximum of two wires.

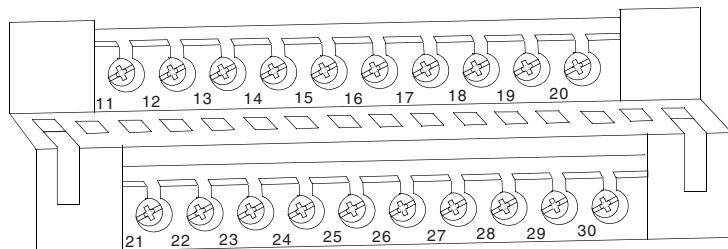
The SMC Dialog Plus controller accepts control power input of either 100...240VAC, (+10/-15%) single-phase, 50/60 Hz or 24V AC/DC. Refer to the product nameplate prior to applying control power. Connect control power to the controller at terminals 11 and 12. The control power requirement for the control module is 40 VA. For controllers rated 97...1000 A, control power is also required for the heatsink fans as defined in Table A. Depending on the specific application, additional control circuit transformer VA capacity may be required.

**Table 1 - Heatsink Fan Power Requirements**

SMC Rating	Heatsink Fan VA
97...360 A	45
500 A	145
650...1000 A	320

### Control Terminals

**Figure 1 - SMC Dialog Plus Controller Control Terminals**



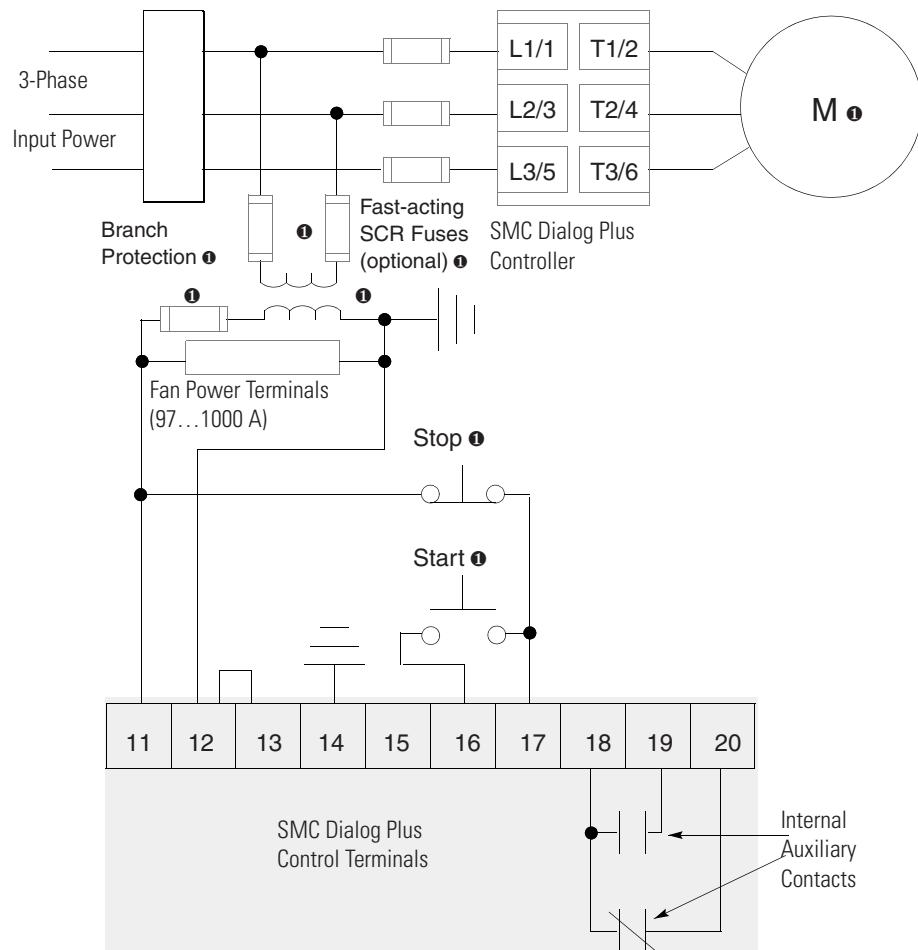
**Table 2 - Control Terminal Designation**

Terminal Number	Description
11	Control Power Input
12	Control Power Common

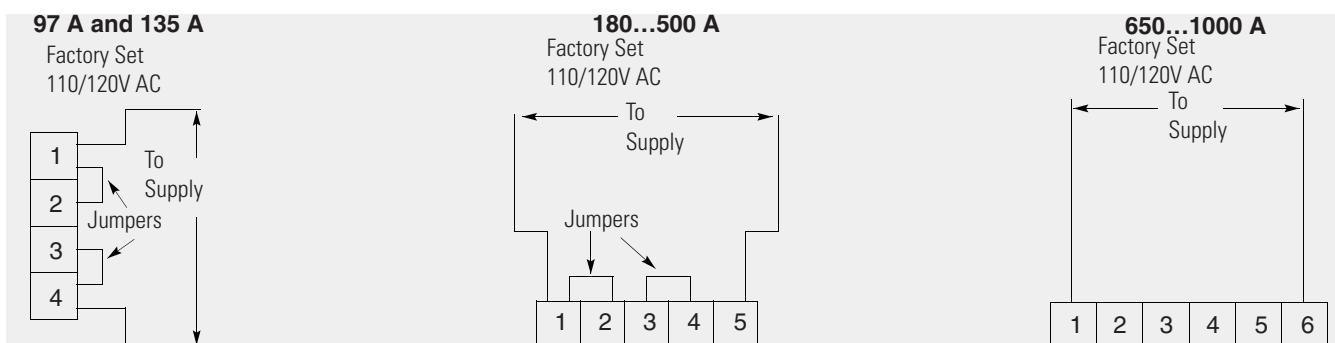
**Table 2 - Control Terminal Designation**

13	Controller Enable Input <b>①</b>
14	Logic Ground
15	Dual Ramp/Option Input <b>①</b>
16	Start Input <b>①</b>
17	Stop Input <b>①</b>
18	Auxiliary Relay Common
19	N.O. Auxiliary Contact #1
20	N.C. Auxiliary Contact #2
21	Not Used
22	Not Used
23	Not Used
24	Not Used
25	Converter Module Fanning Strip Connection <b>①</b>
26	Converter Module Fanning Strip Connection <b>①</b>
27	Converter Module Fanning Strip Connection <b>①</b>
28	Converter Module Fanning Strip Connection <b>①</b>
29	Auxiliary Contact #3
30	Auxiliary Contact #3

**†** Do not connect any additional loads to these terminals. These "parasitic" loads may cause problems with operation, which may result in false starting and stopping.

**Figure 2 - Typical Wiring Diagram**

①Customer supplied.

**Figure 3 - Heatsink Fan Wiring**

Refer to Chapter 3 of the *SMC Dialog Plus Controller User Manual* (Publication 150-5.3) for optional 220/240V AC fan power connections and other sample wiring diagrams. Chapter 7 of Publication 150-5.3 also provides typical wiring diagrams for the control options (for example, Pump Control).

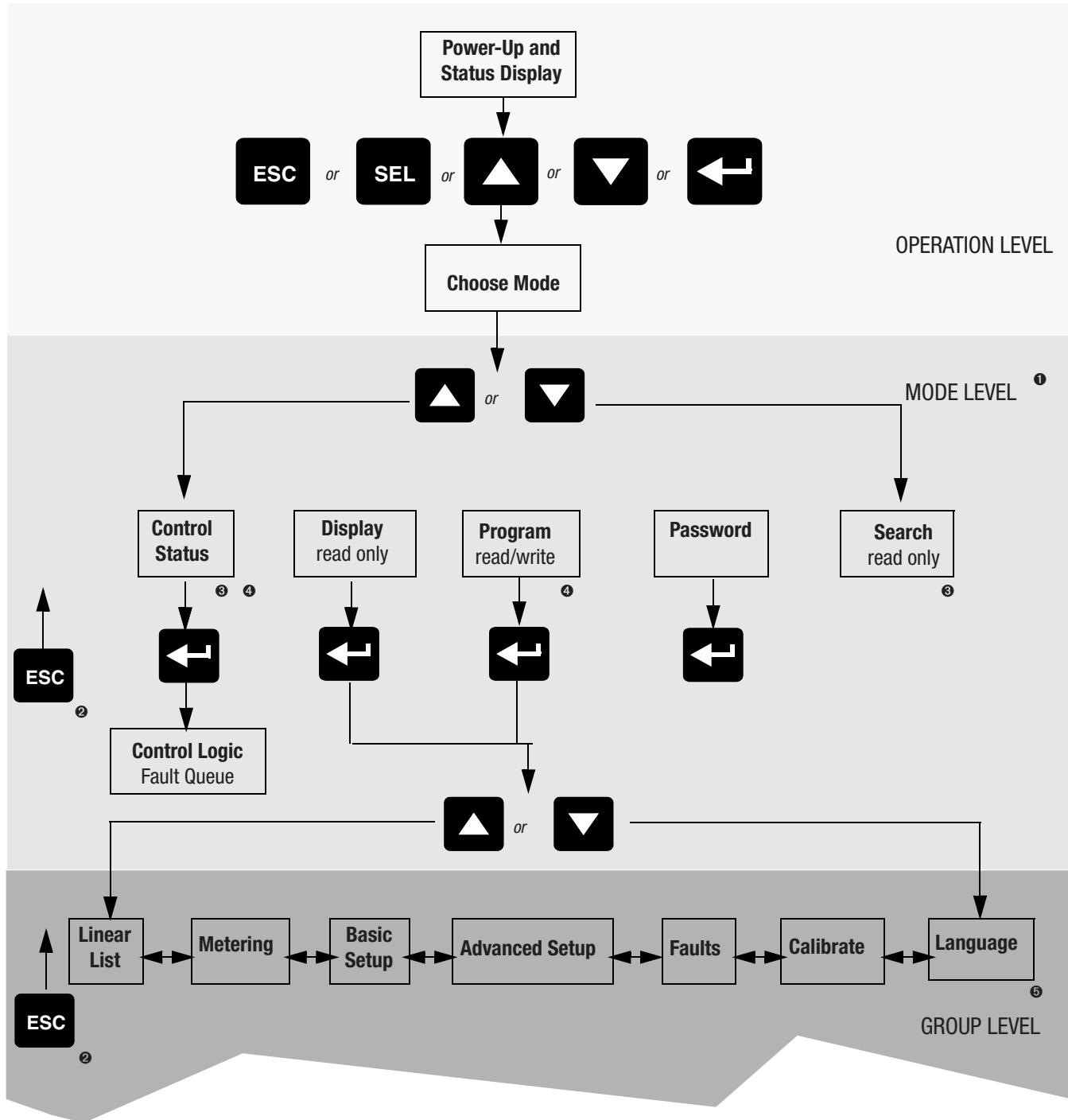
## Programming

The SMC Dialog Plus controller can be programmed with the built-in keypad and LCD display or with the optional Bulletin 1201 human interface modules. Parameters are organized in a four-level menu structure and divided into programming groups.

### Keypad Description

	<b>Escape</b>	Pressing the <i>Escape</i> key causes the programming system to move up one level in the menu structure.
	<b>Select</b>	The <i>Select</i> key has two functions: <ul style="list-style-type: none"> <li>• Pressing the <i>Select</i> key alternately causes the top or bottom line of the display to become active (indicated by flashing first character).</li> <li>• In parameter modification with series A FRN 3.00 or greater and series B human interface modules, <i>Select</i> moves the cursor from the least significant digit to the most significant.</li> </ul>
	<b>Up/Down Arrows</b>	These keys are used to increment and decrement a parameter value or to scroll through the different modes, groups, and parameters.
	<b>Enter</b>	When pressed, a mode or group will be selected, or a parameter value will be entered into memory. After a parameter value has been entered into memory, the top line of the display will automatically become active, allowing the user to scroll to the next parameter.

Figure 4 - Menu Structure Hierarchy



①The SMC Dialog Plus controller does not support EEPROM, Link, Process, or Start-up modes

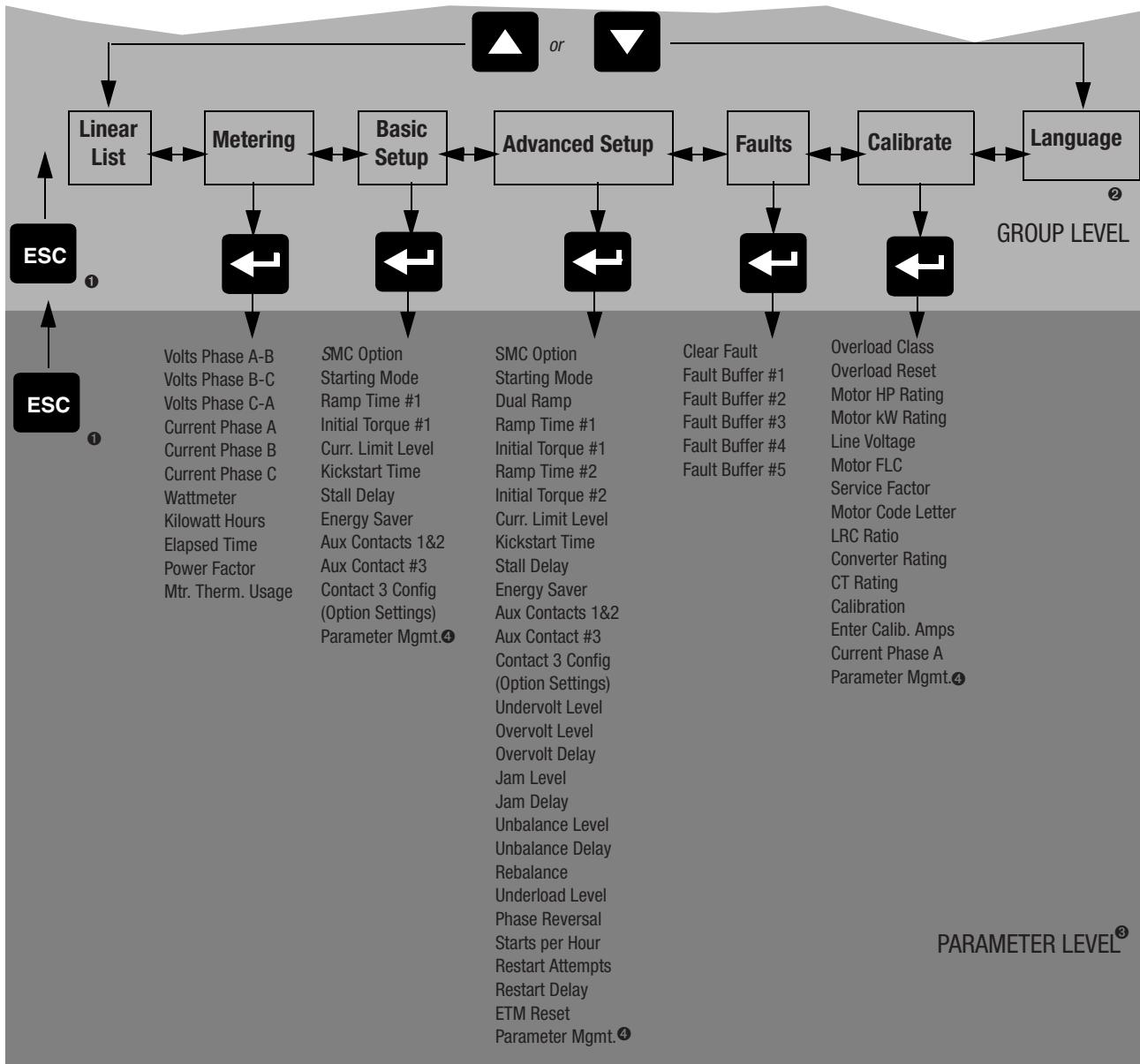
②Steps back one level.

③Control Status and Search are only available when using a Series B Bulletin 1201 human interface module.

④Password protected.

⑤English is currently the only available language.

Figure 5 - Menu Structure Hierarchy, Continued



<sup>①</sup>Steps back one level.

<sup>②</sup>English is currently the only available language

<sup>③</sup>For further information on parameters, see Appendix B of the *SMC Dialog Plus User Manual*, Publication 150-5.3.

<sup>④</sup>For further information on parameter management, see the *SMC Dialog Plus User Manual*, Publication 150-5.3.

## Factory Default Settings

The SMC Dialog Plus controller is pre-programmed with the settings listed in the table below.

Parameter	Setting
Starting Mode	Soft Start
Ramp Time	10 seconds
Initial Torque	70% of locked rotor torque
Kickstart	Off
Energy Saver	Off
Stall	Off
Phase Rebalance	Off
Auxiliary Contacts	Normal
Service Factor	1.15
Overload Class	Off
Line Voltage	480 volts
Motor FLC	1.0 amps
Motor HP Rating	0.0 HP
Motor Code Letter	G



**ATTENTION:** Overload protection in the SMC Dialog Plus controller is disabled from the factory. The user must program the desired overload trip class and motor full load current rating to achieve proper protection

## Saving Programmed Values to Memory

After you have programmed the controller settings you **must** save them to the controller's memory. To do this, follow the steps below:

1. Scroll to Parameter Mgmt. This is the last parameter provided in the Basic Setup, Advanced Setup, and Calibrate programming groups.
2. Select the Store In EE option.
3. Press Enter.

**IMPORTANT** If control power is removed from the SMC Dialog Plus controller before you store the programmed values to memory, all programmed values will be lost.

## Calibration

For current measurement accuracy, use the procedure below to calibrate the SMC Dialog Plus controller to the connected motor. A clamp-on ammeter, which provides a true rms measurement and has a published accuracy of  $\pm 1\%$  (Fluke model 33 or equal), is required to perform this procedure.

## Notes:

1. If you plan to use the Bulletin 825 converter module for current feedback to the SMC Dialog Plus controller, this calibration procedure is not necessary.
2. An unbalanced three-phase system may affect the accuracy of the calibration.
3. It is recommended that Parameter #36, Overload Class, is programmed to OFF during the calibration procedure.

Calibration requires the motor to be operated at full speed. Additionally, the motor must be connected to its load in order that the motor draw as near to its full load current (FLC) rating as possible. This is necessary so that maximum accuracy is achieved for current measurements at overload trip levels.

Description	Action	Display
1. Check all power and control wiring connections to the controller and motor. Apply a start command to the controller and check for motor rotation to full speed.	–	AT SPEED ##.# AMPS
2. Using the clamp-on ammeter, measure the three-phase motor currents. Place the ammeter around the phase with the largest current draw. ①	–	AT SPEED ##.# AMPS
3. In the Calibrate group, scroll to the Calibration parameter.		CALIBRATION OFF
4. Monitor the clamp-on ammeter and verify that the motor current is stable. Press the Select key. Toggle the Up/Down keys to the Activate setting. Press the Enter key to accept. Monitor the ammeter display for the next 2 seconds and record the average value. During this time period, the SMC Dialog Plus controller samples motor response data.	   	CALIBRATION ACTIVATE
5. Access the next parameter using the Up key.		ENTER CALIB. AMPS 0.0 AMPS
6. Press the Select key. Enter the clamp-on meter value monitored in step 4. Press the Enter key to accept. <b>The SMC Dialog Plus controller is now calibrated.</b>	   	ENTER CALIB. AMPS ##.# AMPS

①The currents should measure a minimum of 70% of the motor's full load current rating in order to achieve the best results in accuracy.

Description	Action	Display
7. You can scroll to the next parameter to view the current measurement in phase A.		CURRENT PHASE A ##.# AMPS
8. Scroll to the next parameter to save the Calibrate group settings.		PARAMETER MGMT READY
9. Press the Select key. Scroll with the Up/Down keys to Store In EE selection. Press the Enter key to save the settings to EEPROM.	   	PARAMETER MGMT STORE IN EE



**ATTENTION:** After calibration is completed, program the desired overload class and save the setting to the controller's EEPROM.

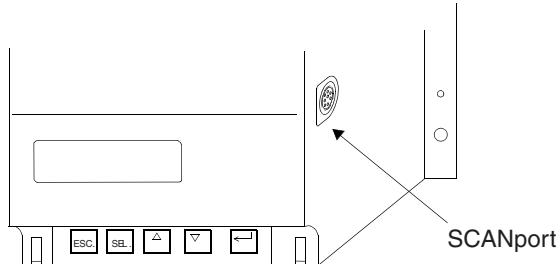


**ATTENTION:** The method of current measurement is not applicable to the multi-motor installations or resistive heating loads. Utilization of the Bulletin 825 converter module is required for these applications if current measurement is required.

## Communication

A serial interface port (called SCANport™) is provided as standard, and allows connection to a Bulletin 1201 human interface module or a variety of Bulletin 1203 communication modules.

**Figure 6 - SCANport Location**



**ATTENTION:** Only one peripheral device can be connected to the SCANport. The maximum output current is 100 mA.

## Human Interface Modules

The Bulletin 1201 human interface modules with control panels can start and stop the SMC Dialog Plus controller. However, the factory default settings disable control commands other than Stop through the serial communication port.

To enable motor control from a connected human interface module, you must take the following programming steps:

### Series A

1. Enter into the Program mode.
2. Select the Linear List programming group.
3. Scroll to the Logic Mask parameter (number 85).
4. Program the Logic Mask parameter for a value of 4.
5. Press Enter.

### Series B

1. Enter the Control Status mode.
2. Select the Enable option of Control Logic.
3. Press Enter.

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**IMPORTANT** Control Logic must be disabled or the Logic Mask set to 0 prior to disconnecting a human interface module from the SMC Dialog Plus controller.

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**Notes:**



## **Rockwell Automation Support**

Rockwell Automation provides technical information on the Web to assist you in using its products.

At <http://www.rockwellautomation.com/support/>, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration, and troubleshooting, we offer TechConnect support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://www.rockwellautomation.com/support/>.

## **Installation Assistance**

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the <a href="#">Worldwide Locator</a> at <a href="http://www.rockwellautomation.com/support/americas/phone_en.html">http://www.rockwellautomation.com/support/americas/phone_en.html</a> , or contact your local Rockwell Automation representative.

## **New Product Satisfaction Return**

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

## **Documentation Feedback**

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication [RA-DU002](#), available at <http://www.rockwellautomation.com/literature/>.

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